## *REMARKS / ARGUMENTS*

This application is believed to be in condition for allowance because the claims are believed to be non-obvious and patentable over the cited references. The following paragraphs provide the justification for this belief. In view of the following reasoning for allowance, the Applicant hereby respectfully requests further examination and reconsideration of the subject patent application.

## 1.0 Premature Final Rejection:

As explained in M.P.E.P. 706.07(d), "If, on request by applicant for reconsideration, the primary examiner finds the *final rejection to have been premature, he or she should withdraw the finality of the rejection*. The finality of the Office action *must* be withdrawn while the application is still pending." (emphasis added)

M.P.E.P. 706.07(a) explains that "second or any subsequent actions on the merits shall be final, *except where the examiner introduces a new ground of rejection* that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement..." (emphasis added).

The examiner *has* introduced new grounds of rejection. In fact, the Office Action states in paragraph 9, page 11: "Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection." However, there is no indication in the current Office Action that the new grounds of rejection were necessitated by the Applicant's amendment in the prior response. In fact, the amendments offered in the prior response consisted of either clarifying language consistent with the specification, or of the incorporation of existing limitations of dependent claims into the independent claims. For these reasons, Applicant believes that the new grounds of rejection are *not* based on those amendments.

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Consequently, in view of the aforementioned requirements of M.P.E.P. 706.07(a), the Applicant respectfully suggests that the finality of the current Office Action is premature. Therefore, because the current Office Action provides new grounds of rejection in rejecting the claims, in accordance with M.P.E.P. 706.07, the finality of the prior Office Action must be withdrawn as being premature. Thus, Applicants respectfully request immediate withdrawal of the finality of the rejections advanced in the current Office Action, and further examination and reconsideration of the claimed invention.

## 2.0    Rejection of Claim 20 under 35 U.S.C. §112:

The Office Action of June 7, 2005 rejected claim 20 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Office Action characterizes claim 20 by suggesting:

> "The Applicant states that an image is divided into two image levels, an operation along these lines would require one threshold value. Using two threshold values would result in an image divided into three image levels. So when the applicant states "as a function of first and second thresholds" the examiner interprets this statement to mean that two threshold holds are set which means three image levels. However, the section immediately preceding the quotation states that the image is divided into two image levels. Therefore claim 20 contradicts itself. The examiner has taken claim 20 to mean that an image is thresholded into two levels, as this seems to be the action performed in the rest of the claims."

In contrast to the position advanced by the Office Action, the Applicant respectfully suggest that the Examiner is misinterpreting the claimed language and reading the claim in a manner that is clearly inconsistent with the detailed description of the specification. In particular, as described in paragraphs [0060] through [0066] of the Applicants published patent application (United States Patent Application 20030063814):

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"[0060] In an exemplary implementation having a VGA-resolution sensor and a U.S. letter-size (or A4-size) text document, each digital camera pixel covers roughly {fraction (1/72)} inch (0.054 mm) square which is larger than the stroke width for most 9 point fonts. *De-blurring method 130* can provide accurate classification of enhanced resolution pixels despite such constraints.

[0061] Process block 132 indicates that a binary image W is formed of locations that are within a *threshold $T_{w1}$* of being a background level (e.g., white).

[0062] Process block 134 indicates that a binary image B is formed of locations that are within a *threshold $T_{b1}$* of being a foreground level (e.g., black).

[0063] Process block 136 indicates that *the binary images W and B* are filtered by a blur function b having the same dimension as the sensor averaging area (e.g., approximately the pixel pitch or width p). The filtering of the binary images W and B may be represented as W*b, and B*b, with b being the VGA blur function at the enhanced or target resolution. The filtering may be characterized by the following propositions:

[0064] A gray pixel that is within p of a white pixel can not be black

[0065] A gray pixel that is within p of a black pixel can not be white.

[0066] These propositions are based upon the averaging nature of the digital camera sensors, which blur white to black transitions by 2p."

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Applicant respectfully suggests that claim 20 does *not* "contradict itself" as suggested by the Office Action. In particular, in light of the above cited text, it is clear that, as claimed, "de-blurring the enhanced resolution representation of the text document includes **conforming the enhanced resolution representation to only two image levels as a function of first and second thresholds**", specifically **threshold $T_{w1}$** and **threshold $T_{b1}$**. As explained in paragraphs [0061] and [0062], these thresholds are used to conform the text document to one of two binary images, image "B", as a function of **threshold $T_{b1}$**, and image "W" as a function of **threshold $T_{w1}$**. Consequently, it should be clear that not only does claim 20 *not* contradict itself, but it is also **fully consistent** with the specification.

Therefore, in view of the preceding discussion, the Applicant respectfully traverses the rejection of claim 20 under 35 U.S.C. §112, second paragraph, and respectfully requests reconsideration of the rejection of claim 20 under 35 U.S.C. §112, second paragraph.

### 3.0 Rejections under 35 U.S.C. §103:

The Office Action rejected claims 1-4, 6-8, 11-13, 16-20, and 22-33 under 35 U.S.C. §103(a) as being unpatentable over Crinon, et al. ("**Crinon**," U.S. Patent 6,285,804), in view of Steinkirchner ("**Steinkirchner**," U.S. Patent 5,392,365)

In order to deem the Applicant's claimed invention unpatentable under 35 U.S.C. §103(a), a prima facie showing of obviousness must be made. However, as fully explained by the M.P.E.P. Section 706.02(j), to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, *the prior art reference (or references when combined) must teach or suggest all the claim limitations*.

Further, in order to make a prima facie showing of obviousness under 35 U.S.C. 103(a), all of the claimed elements of an Applicant's invention must be considered, especially when they are missing from the prior art. If a claimed element is not taught in the prior art and has advantages not appreciated by the prior art, then no prima facie case of obviousness exists. The Federal Circuit court has stated that it was error not to distinguish claims over a combination of prior art references where a material limitation in the claimed system and its purpose was not taught therein (*In Re Fine*, 837 F.2d 107, 5 USPQ2d 1596 (Fed. Cir. 1988)).

### 3.1    Rejection of Claims 1-4, 6-8, and 11-12:

In general, the Office Action rejected independent claim 1 under 35 U.S.C. §103(a) based on the rationale that the *Crinon* reference discloses the elements of he Applicant's claimed "text document capture method" with the exception of "possible items that could be imaged" by the *Crinon* technique, or "or post imaging processing." The Office Action then offers the *Steinkirchner* reference as disclosing thresholding two tone images into two colors and post processing of text documents, and suggests that combining the post processing techniques offered by *Steinkirchner* with the resolution enhancement techniques offered by the *Crinon* reference discloses the Applicant's claimed invention.

However, in contrast to the position advanced by the Office Action, the Applicant respectfully suggests that the *Crinon* does not disclose the Applicants claimed invention when combined with the *Steinkirchner* reference, and that, if fact, the Office Action has incorrectly interpreted the *Crinon* reference in an attempt to show an equivalency to particular elements of the Applicant's claimed invention.

In particular, the Office Action offers co. 5, line 28 to col. 6, line 3 of the *Crinon* reference as teaching "forming from the multiple laterally displaced images an enhanced resolution representation of the text document as a function of the fractional pixel offset positions," as disclosed and claimed by the Applicant.

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However, as explained by *Crinon* in 3, lines 41 to col. 4, line 35, the parameters of a "global motion model" are estimated by estimating motion models *between a reference image and every other image* in a set of *N* low resolution images. This global motion model is then used to derive "motion vectors" for every pixel in the set of low resolution images relative to the "reference image", with the *motion vectors then being used to map* high resolution grid points onto the low resolution images to form a set of mapped "inter-pixel positions" on each low resolution image. Then, one or more "low-resolution pixels" from each low resolution image having a "closest spatial distance" to the "inter-pixel positions" are identified. Next, one or more of these identified "low-resolution pixels" having a "shortest distance" relative to the "high-resolution grid points" are selected, and the intensity values of those selected "low-resolution" pixels are mapped into the corresponding "high-resolution grid points." Note that this process is also explained in claims 1 and 9 of the *Crinon* reference.

In stark contrast, unlike the *Crinon* reference, rather than computing global motion models, deriving motion vectors from the motion model for relating a reference image to every other image, mapping image pixels to "inter-pixel positions" which are in turn used to map pixel intensities to "high-resolution grid points," the Applicants simply compute enhanced resolution images as *a direct function of the fractional pixel offset positions*, as described and claimed.

For example, as described by the Applicant in paragraph [0048]:

> "[0048] *One implementation of determining each enhanced resolution pixel employs a weighted combination of multiple (e.g., 3) image pixel samples that are nearest the enhanced resolution pixel.* As shown in FIG. 6, the value PE of an enhanced resolution pixel 110 may be *calculated as a weighted sum of the image values $S_A$, $S_B$, and $S_C$ of the three nearest image pixel samples* 112A, 112B, and 112C:

$$P_E = W_A S_A + W_B S_B + W_C S_C$$

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Clearly, the process for generation of high resolution images that is described and claimed by the Applicant is vastly less complicated than the process described and claimed in the *Crinon* reference. Further, it appears that the only commonality between the two methods is that both methods make use of a plurality of images having potential offsets measured in fractional pixel distances. Consequently, it can not be fairly stated that the *Crinon* reference in any way discloses the Applicant's claimed system for "forming from the multiple laterally displaced images an enhanced resolution representation of the text document *as a function of the fractional pixel offset positions*." Further, the Applicant respectfully suggests that broadening the interpretation of the language of claim 1 to encompass the teachings of the *Crinon* reference are clearly unreasonable in light of the clear discussion of both the Applicants specification and the discussion provided in the *Crinon* reference.

Thus, it is clear that the present invention, as claimed by independent claim 1 includes elements not taught in the proposed *Crinon - Steinkirchner* combination reference. Consequently, the rejection of independent claim 1, and thus of dependent claims 2-8 and 11-12, under 35 U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully requests traverses the rejection of claims 1-8 and 11-12 under 35 U.S.C. §103(a) in view of the novel language of claim 1, and respectfully requests reconsideration of the rejection of those claims. In particular, claim 1 recites the following novel language:

> "A text document capture method for digitizing a text document segment in printed form, comprising:
>
> imparting a *continuous lateral jittering* between a digital imaging device and the text document;
>
> obtaining multiple laterally-displaced digital images of all of the text document segment *during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained*;

forming from the multiple laterally displaced images an enhanced resolution representation of the text document *as a function of the fractional pixel offset positions*; and

de-blurring the enhanced resolution representation of the text document *by thresholding the enhanced resolution representation into either one of two pixel luminance levels*, representing foreground and background pixels, with the foreground pixels corresponding to text in the text document." (emphasis added)

## 2.2    Rejection of Claims 13-20, 22, and 23:

In general, the Office Action rejected independent claim 13 under 35 U.S.C. §103(a) over the proposed *Crinon - Steinkirchner* combination reference using virtually the same rationale as discussed above with respect to the rejection of claim 1. However, independent claim 13 includes limitations similar in scope to the limitations of claim 1, as discussed above.

In particular, independent claim 13 also recites elements relating to construction of enhanced resolution images "*as a function of the pixel offset positions corresponding to each digital image.*" For example claim 13 recites the following language:

"A text document capture system for digitizing with a digital imaging device a segment of a text document in printed form, comprising:

a jittering mechanism for imparting a *continuous lateral jittering* between the text document and the digital imaging device *while it obtains multiple laterally-displaced digital images* of all of the text document segment, *said lateral jittering moving through a distance being on the order of around one pixel*;

a *pixel offset determination system for determining fractional pixel offset positions at which each digital image was obtained*;

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and a processing system for forming an enhanced resolution
representation of the text document segment from the multiple laterally
displaced images *as a function of the pixel offset positions
corresponding to each digital image*, and for de-blurring the enhanced
resolution representation." (emphasis added)

As with claim 1, the elements recited above are not disclosed or in any way
rendered obvious by the proposed *Crinon - Steinkirchner* combination reference.
Therefore, because the present invention, as claimed by independent claim 13 includes
elements not taught in the proposed *Crinon - Steinkirchner* combination reference, the
rejection of independent claim 13, and of dependent claims 14-20, 22, and 23, under 35
U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully traverses the rejection
of claims 13-20, 22, and 23 under 35 U.S.C. §103(a) in view of the novel language of claim
13, as cited above, and respectfully requests reconsideration of the rejection of those
claims.

## 2.3    Rejection of Claims 25-29 and 31-32:

In general, the Office Action rejected independent claim 25 under 35 U.S.C. §103(a)
over the proposed *Crinon - Steinkirchner* combination reference using the same rationale
as discussed above with respect to the rejection of claims 1 and 13. However,
independent claim 25 includes limitations similar in scope to the limitations of claim 1 and
claim 13, as discussed above.

In particular, independent claim 25 also recites elements relating to construction of
enhanced resolution images "*as a function of the fractional pixel offsets*." For example,
claim 25 recites the following language:

"In a computer-readable medium, text document capture software for
digitizing with a digital imaging device a text document segment in printed
form, comprising:

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> software for imparting controlled **_continuous lateral jittering_**
> **_between the text document and the digital imaging device_**;
>
> software for obtaining multiple laterally-displaced digital images of all
> of the text document segment **_at a plurality of non-predetermined_**
> **_fractional pixel offsets_** relative to an original position of the text document
> relative to the digital imaging device;
>
> software for **_determining the fractional pixel offsets of each digital_**
> **_image_**;
>
> software for forming an enhanced resolution representation of the text
> document segment from the multiple laterally displaced images **_as a_**
> **_function of the fractional pixel offsets_**; and
>
> software for de-blurring the enhanced resolution representation."

(emphasis added)

As with claims 1 and 13, the elements recited above are not disclosed or in any way rendered obvious by the proposed **_Crinon - Steinkirchner_** combination reference. Therefore, because the present invention, as claimed by independent claim 25 includes elements not taught in the proposed **_Crinon - Steinkirchner_** combination reference, the rejection of independent claim 25, and of dependent claims 26-29 and 31-32, under 35 U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully traverses the rejection of claims 25-29 and 31-32, under 35 U.S.C. §103(a) in view of the novel language of claim 25, as cited above, and respectfully requests reconsideration of the rejection of those claims.

## 2.4    Rejection of Claim 33:

In general, the Office Action rejected independent claim 33 under 35 U.S.C. §103(a) over the proposed **_Crinon - Steinkirchner_** combination reference using the same rationale as discussed above with respect to the rejection of claims 1 and 13. However, independent claim 33 includes limitations similar in scope to the limitations of claim 1 and claim 13, as discussed above.

In particular, independent claim 33 includes elements relating to "forming... an enhanced resolution representation... *as a function of the computed fractional pixel offset distances*." For example, claim 25 recites the following language:

> "An image capture method for digitizing a spatially piecewise constant image, comprising:
>
> imparting a *continuous lateral jittering between a digital imaging device and the spatially piecewise constant image*;
>
> obtaining multiple laterally-displaced digital images of all of the spatially piecewise constant image *during the continuous later jittering*;
>
> *computing a fractional pixel offset distance representing a pixel capture position for each digital image*;
>
> forming from the multiple laterally displaced images an enhanced resolution representation of the spatially piecewise constant image *as a function of the computed fractional pixel offset distances*; and
>
> de-blurring the enhanced resolution representation of the spatially piecewise constant image." (emphasis added)

As with claims 1 and 13, the elements recited above are not disclosed or in any way rendered obvious by the proposed *Crinon - Steinkirchner* combination reference. Therefore, because the present invention, as claimed by independent claim 33 includes elements not taught in the proposed *Crinon - Steinkirchner* combination reference, the rejection of independent claim 33 under 35 U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully traverses the rejection of claim 33 under 35 U.S.C. §103(a) in view of the novel language of claim 33, as cited above, and respectfully requests reconsideration of the rejection of those claims.

## 3.0    Rejection of Claims 5, 14, and 15:

The Office Action rejected dependent claims 5, 14, and 15 under 35 U.S.C. §103(a) as being unpatentable over *Crinon* in view of *Steinkirchner*, and in further view of

Matsumoto, ("*Matsumoto*" U.S. Patent 5,801,814). However, it should be noted that claim 5 is dependent from independent claim 1, while claims 14 and 15 are dependent from independent claim 13, which, as discussed above, is patentable under 35 U.S.C. §103(a). Consequently, because there is no valid rejection of the parents claim (claims 1 and 13, respectively), the use of an additional reference to address a particular feature of a dependent claim is insufficient to provide valid grounds for rejection of the dependent claim (claims 5, 14, and 15). Consequently, as there is no valid rejection of claims 1 and 13, the Applicants respectfully traverse the rejection of claims 5, 14, and 15, under 35 U.S.C. §103(a) based on the novel language of independent claims 1 and 13.
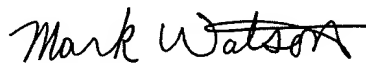
**4.0    Rejection of Claim 24:**

The Office Action rejected dependent claim 24 under 35 U.S.C. §103(a) as being unpatentable over *Crinon* in view of *Steinkirchner*, and in further view of Reinsh, ("*Reinsh*" U.S. Patent 5,083,313). However, it should be noted that claim 24 is dependent from independent claim 13, which, as discussed above, is patentable under 35 U.S.C. §103(a). Consequently, because there is no valid rejection of the parent claim (claim 13), the use of an additional reference to address a particular feature of a dependent claim is insufficient to provide valid grounds for rejection of the dependent claim (claim 24). Consequently, as there is no valid rejection of claim 13, the Applicants respectfully requests reconsideration of the rejection of claim 24 under 35 U.S.C. §103(a) based on the novel language of independent claim 13.

## CONCLUSION

In view of the above discussion, it is respectfully submitted that claims 1-8, 11-20, 22-29 and 21-33 are in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of claims 1-8, 11-20, 22-29 and 21-33, and the objection to claim 20, and to pass this application to issue at the earliest opportunity. Additionally, in an effort to further the prosecution of the subject application, the Applicant kindly invites the Examiner to telephone the Applicant's attorney at (805) 278-8855 if the Examiner has any additional questions or concerns.

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